and other points will be discussed in our memoir on the London femora now at press. I write at present at this length merely to indicate that in suggesting to Dr. Lee to illustrate her tables on Dr. Parsons's material, I had in view many observational points which Dr. Parsons, like not a few of our English critics, considers we have made no attempt to appreciate—being "mere mathematicians." KARL PEARSON.

Galton Laboratory, University of London.

A Remarkable Dry Fog in the East Indian Archipelago.

THE observations made on Ben Nevis upon the transparency of the air have shown very clearly that with increasing relative humidity the transparency is diminishing, a consequence of the increasing volume of the light-scattering particles, from which it may be concluded that the particles are of hygroscopic character.

The influence of humidity on the size of these particles was obvious in a very striking way in the dense dry fog that towards the end of the dry monsoon of 1914 spread out over the East Indian archipelago, causing much trouble to navigation.

A short description of this phenomenon is given below. The fog had a grey colour, and was most intense in the month of September, and especially in October, and disappeared when the rains fell. In its most typical form it appeared in Sumatra, in the neighbourhood of Ambon and the islands to the south-east.

In Sumatra it was observed to the north as far as Medan (Deli), the Karo plateau near the Toba lake and Tapanoeli, to the south as far as Benkoelen and the highlands of Kerintji. It was not observed in the open ocean outside the Mentawei Islands.

In the morning the sun was not visible before eight o'clock, when it appeared as a dim red disc. Objects in general were barely visible at 500 metres' distance, and on the thickest days invisible within half this distance; the mountains had disappeared entirely from view.

In Ambon the sea was sometimes invisible from the lighthouse, which is situated close to the shore, and 140 metres above the sea. Also in the straits between Sumatra and Borneo, and the west and east coast of Borneo, the fog was very thick, and though in somewhat less degree it was also observed in the northern part of the Strait of Makasser, on the north coast of New Guinea (in these regions, however, it was more or less mixed up with smoke from forest fires, which caused local intensification), on Sumatra's west coast north of Padang and Malakka Strait.

Though in the other parts of the archipelago the transparency of the air was greater, it was not quite clear, on account of the blue haze that is common to the dry season.

A similar phenomenon (described by Dr. van Bemmelen, *Meteorl. Zeitschr.*, August, 1905), perhaps still more intense, was observed in the very dry year 1902; it then extended to the southern part of the China Sea and to the south-east so far as the Tanimber Islands, the region of greatest intensity being about the same as in 1914. It was also reported from the abnormally dry years 1885, 1888, 1891, and 1896. In Karimata Strait it is a common phenomenon.

Now it is very remarkable that the southern boundary of the fog coincides rather closely with a well-defined line, that separates the region of practically no rainfall from that of greater humidity where light rains begin to appear. In 1914 this line ran in the months of September and October over the south-east point of Sumatra, along Billiton and Borneo's south coast, through Makassar Strait, along North Celebes, and south-eastwards along the south coast of New Guinea, Ambon, and the region south-east of it lying as an oasis of light rainfall in the dry region.

From this it is evident that it is the hygroscopic particles that form the blue haze in the south-eastern part of the archipelago, which, entering into moister regions and increasing their radius, give rise to the appearance of the grey fog.

Physical laws fully account for the fact that the fog is a mere intensification of the haze, though the rather fast transition of the light blue haze to the much thicker grey fog gives the impression of a new phenomenon springing into existence.

So long as the particles are much smaller than the wave-length, the intensity of the scattered light in relation to that of the light falling upon it, may be represented by $I=\alpha r^6/R^2\lambda^4$, when r is the radius of the particle, R the distance from the observer, and λ the wave-length. When r is increasing, the ordinary reflection ultimately appears, and $I=\beta r^2/R^2\lambda^0$.

From the method of dimensions may be concluded (conf. Rayleigh, "Theory of Sound," II., p. 152), I being a simple ratio and α and β passing gradually and rather slowly into each other as r increases, that as the exponent (n) of λ is changing from 4 to 0 the exponent (m) of r changes from 6 to 2. Therefore, so long as n is large enough to produce a colouring of the haze, m will cause a very rapid increase of the intensity of the scattered light, which may account for the rather sudden change of the blue haze to the grey fog.

It is not in the first place the greater number of particles that account for the difference between the transparency of the air in the dry and wet season, but their hygroscopic character. On December 23, 1914, when the wet season had already set in, I counted with Aitken's apparatus at Batavia 50,000 particles in 1 cub. cm., the relative humidity being 84 per cent., and no trace of haze was to be seen. However, on the Ardjoeno (at 2500 metres' height) on October 29, towards the end of the dry season, their number was only 1800 in 1 cub. cm., and notwithstanding the humidity was only 40 per cent., the surroundings were enveloped in an intense blue haze. Especially these very hygroscopic particles, when entering moister regions, will be susceptible to a strong increase of volume, and therefore will be the principal producers of the fog.

When we put the question where those highly hygroscopic particles come from that are responsible for the phenomenon described above, it may be remarked that for the greater part they do not form during the short journey of the trade wind over the archipelago. This takes only a few days, whereas the fog appears after many months of excessive drought. Two causes may be mentioned to which they owe their existence, viz., burning processes in Australia, which are also most frequent after long-prolonged droughts; and, secondly, which I take for the greater influence, the formation from the components of the air, ozone, nitrogen, etc., during the slow descending movement in the Australian anti-cyclone, in which the air probably takes several months to reach the layers near the surface of the earth. C. BRAAK.

Batavia, January, 1915.

A Penalty on Research.

IF Sir Wm. Ramsay was refused a rebate of the duty on alcohol I could scarcely expect better treatment. Nevertheless, I should like to add to his protest, and complaint After a correspondence lasting

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several weeks and some courtesy showed me by the local authorities I received the bluntest refusal to my request for a small supply of duty-free alcohol at my private laboratory in Cambridge, and this in spite of the fact that owing to an accident I am permanently prevented from leaving my house and availing myself of the duty-free alcohol at the biochemical laboratory of the University. H. ONSLOW.

11 St. James's Square, S.W., February 19.

MANY who, like myself, are privately engaged in biological research, will feel grateful to Sir William Ramsay for having directed attention to the difficulties which are unreasonably put in their way in regard to the supply of alcohol. May I take this opportunity of adding that, for those not connected with some university or museum, the only methylated spirit obtainable is adulterated to make it undrinkable, which also makes it absolutely useless for the operations of the biologist, who is thus driven to incur great expense in the purchase of alcohol. Some time ago I applied to the excise officers here for a licence to be supplied with methylated spirit for use in research work, and I offered to enter into any bond and to comply with any regulations they liked to impose to ensure its safe custody and honest use. After a correspondence extending over nearly three months, this licence was refused. I hope that Sir William Ramsay's letter may receive attention in the proper quarters, and that reasonable facilities may be given for the supply of both alcohol and methylated spirit for the purposes of research. ARNOLD T. WATSON.

Sheffield, February 22.

Cement for Polarimeter Tubes.

I SHALL be much obliged if any reader of NATURE will suggest a cement suitable for fastening the end discs tc polarimeter tubes. The cement I should like to hear of should be capable of withstanding the action of organic liquids at temperatures between 200°–300° Fusion of the discs to the tubes would, of course, be best, but would be almost certain to introduce strain. There is no great difficulty in working without cement up to about 200°, but beyond the temperature at which rubber melts—and is, therefore, unsuitable for washers—the problem of keeping the liquid in its tube is by no means a simple one. Possibly someone engaged in work making similar demands may be able to assist me. T. S. PATTERSON.

University of Glasgow, February 20.

The Prices of Chemicals.

"J. J.'s" complaint against chemical dealers for unduly raising prices in consequence of the war seems to have been unjustifiable in the case he mentioned, but it would apply in some other cases. A few weeks ago I wrote to several dealers for some racemic acid; one firm, who had a stock of only half an ounce, let me have it at the pre-war price, whilst another, with a larger stock, charged me just double. S. P.

THE MANUFACTURE OF DYESTUFFS.

THE GOVERNMENT'S MODIFIED SCHEME.

THE discussion on the various aspects of the problem of producing in this country an adequate supply of dyestuffs proceeds without intermission. The question has for some time assumed a national aspect and has been the subject of Parliamentary debate or question on at least three occasions. It has also been debated at meetings of the Chambers of Commerce in the chief industrial centres, and people most directly interested have had many opportunities of expressing their opinions at meetings of their various organisations, or at gatherings specially convened for the purpose.

To a great extent the discussions have centred round the adequacy and equity of the commercial proposals involved in the official scheme now before the public. These have received much more general acceptance than those put forward in the first scheme, and it appears probable that the committee has now received promises of support to an amount representing a substantial proportion of the initial capital proposed for the new company.

The members of the committee themselves admit that it is an easy matter to criticise the scheme adversely, and it is obviously impossible to devise a solution of the problem satisfactory to all minds.

If the matter is to be viewed as an ordinary commercial proposition, if questions of free trade or protection are to be taken into account, or if early dividends are to be assured, then any scheme which might be put forward could be shown to be unworthy of support. But whilst criticism on these lines has been plentiful, there has latterly been a rally of support by those taking broader views—a support which has probably been largely induced by a sense of national need, and has certainly been greatly developed by the action of the Government in offering to endow the research work which is essential to the extent of 100,000*l*. This action has engendered a feeling of confidence that the Government will take any further steps which the future may show to be vital to the success of the British dye manufacturing industry.

It is to be hoped that the committee in charge of the scheme will shortly be able to announce the results of its inquiries and that these will show that the great textile trade of the country has responded adequately. In the meantime, the arrangements for carrying out the necessary preliminary chemical work should be proceeded with.

A Mobilisation of Chemists.

Speaking in Bradford on February 8, the present writer advocated immediate action by the Government or the Board of Trade Advisory Committee in the direction of utilising the services of British chemists. There is on one hand a large amount of chemical work to be done before the industry can be greatly developed, and on the other, there is a great number of well-staffed and well-equipped laboratories in our universities and technical colleges which might render great service to the industry. To avoid wasteful duplication of work and to co-ordinate the results, it is essential that some organised scheme and allotment of work should be arranged, and it is suggested that a conference of those concerned

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